

# Ecology Test Answer Sheet

BCS Cobra Invitational - Jan 21, 2017

<b>Team Name</b>		<b>Team Number</b>	
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1 – 56	1 point
57 – 59	3 points
<b>Total</b>	<b>65 points</b>

**Tiebreaker:** 59, 58, 57, 53, 36, 23



# Ecology Test

Answers must be shaded-in on the separate answer sheet; Question 1-56 (1 pt each) ; 57-59 ( 3 pts each)

1. All the organisms of one species living in one area are known as a(n)

A. community  
B. population  
C. species  
D. ecotype  
E. detritivore

2. All the organisms living in one area are known as a(n)

A. community  
B. population  
C. species  
D. ecotype  
E. detritivore

3. All of the following are characteristics of populations

**EXCEPT**

A. Size  
B. Density  
C. Age distribution  
D. Phenotype  
E. Death rate

4. The result of the action of decomposers is

A. decrease in ammonia  
B. increase in transpiration  
C. nitrogen fixation  
D. decrease in oxygen  
E. increase in oxygen

5. What is the role of diatoms in any food chain?

A. Primary consumers  
B. Secondary Consumers  
C. Tertiary consumers  
D. Producers  
E. Decomposers

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Choose the answers for questions in this block from the terms below.

A. *Herbivore*  
B. *Producer*  
C. *Primary consumer*  
D. *Secondary consumer*  
E. *Decomposer*

6. Converts solar energy to chemical bond energy

7. Has the greatest mass in any food chain

8. Fungi are an example of this

9. Contains the most pesticides of any organism on the list

10. A primary consumer is also this

11. Has the least biomass in a food chain

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12. Which of the following shows the correct order of the biomes as you move from the equator to the North Pole in the western hemisphere?

A. Tropical rain forest - desert - temperate rain forest - taiga - tundra  
B. Tundra - taiga - temperate deciduous forest - desert - tropical rain forest  
C. Desert - taiga - tundra - temperate deciduous forest - tropical rain forest  
D. Tundra - temperate deciduous forest - taiga - desert - tropical rain forest  
E. Desert - tropical rain forest - temperate deciduous forest - taiga - tundra

13. All of the following are correct about the food chain

**EXCEPT**

- A. Bacteria and fungi act as decomposers that recycle nutrients
- B. producers are always at the bottom of any food chain
- C. energy is lost at each trophic level
- D. food chains never have more than 4 or 5 trophic levels
- E. pesticides tend to be concentrated at the producer level because producers have the largest mass in a food chain

14. Eutrophication refers to

- A. the process that causes the depletion of the ozone layer
- B. global warming
- C. the process that happens to a lake that absorbs too many nutrients
- D. invasion of new species that causes damage to an ecosystem
- E. the process whereby one species outcompetes another species

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**Choose the answers for questions in this block from the terms below.**

- A. *Nitrogen - fixing bacteria*
- B. *Denitrifying bacteria*
- C. *Nitrifying bacteria*
- D. *Fungi*
- E. *Plants*

15. These live in the roots of legumes

16. Convert the ammonium ion into nitrates

17. Convert nitrates into free nitrogen in the atmosphere

18. Convert free nitrogen from the atmosphere into the ammonium ion

**Choose the answer for questions in this block from the terms below:**

- A. *Mutualism*
- B. *Parasitism*
- C. *Commensalism*
- D. *None of the above*
- E. *A, B, and C*

19. Both organisms benefit

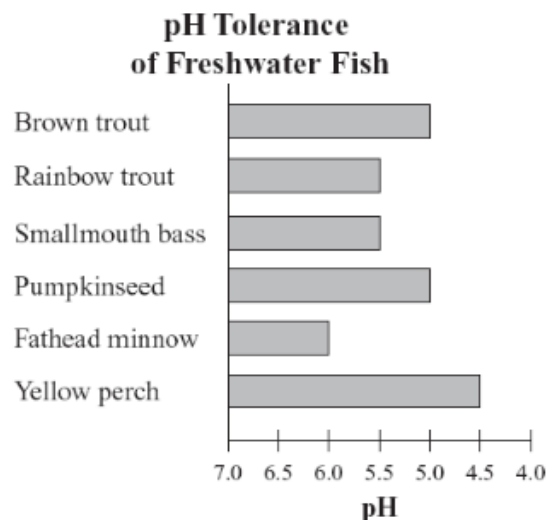
20. One organism benefits; the other organism is not affected by the first organism

21. Example of symbiosis

22. Example of Batesian mimicry

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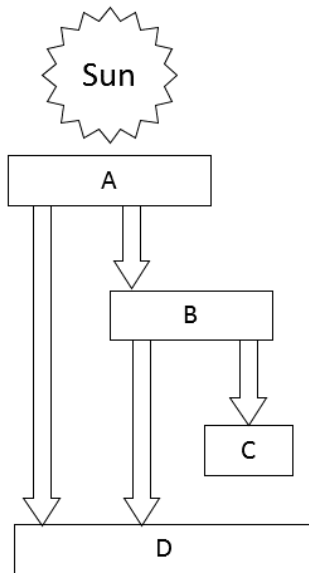
23. The graph below shows the levels of acidity that different kinds of freshwater fish can tolerate. Based on the data, which of the following fish would most likely experience the largest population declines due to acid rain pollution?



- A. Brown trout
- B. Smallmouth bass
- C. Fathead minnow
- D. Yellow perch
- E. Pumpkinseed

Questions in this block refer to the sketch below:

This sketch shows the flow of energy through principal trophic levels in an ecosystem



24. Which level has the greatest biomass

- A. A
- B. B
- C. C
- D. D
- E. It cannot be determined

25. Which level has the fewest numbers of organisms?

- A. A
- B. B
- C. C
- D. D
- E. It cannot be determined

26. Which organism most likely occupy level D?

- A. Bacteria
- B. Snakes
- C. Bats
- D. Cows
- E. Humans

27. All of the following are density-independent factors

EXCEPT

- A. Floods
- B. Famine
- C. Earthquakes
- D. Tsunamis
- E. Naturally occurring fires

28. Which of the following constitutes a likely food chain?

- A. Squid - small fish - algae - orca whales - copepods
- B. Copepods – squid - small fish - algae - orca whales
- C. Algae – copepods - small fish - squid - orca whales
- D. Copepods – algae – squid - small fish - Orca whales
- E. Algae - small fish - squid - copepods - orca whales

29. Characteristics of the arctic tundra biome include which of the following?

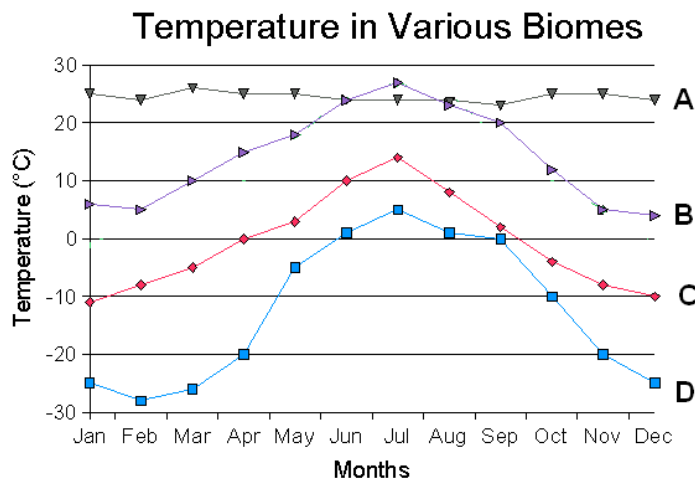
- I. Lichens growing on bare rock
- II. High levels of precipitation
- III. Permafrost

- A. I only
- B. III only
- C. I and II only
- D. I and III only
- E. I, II, and III

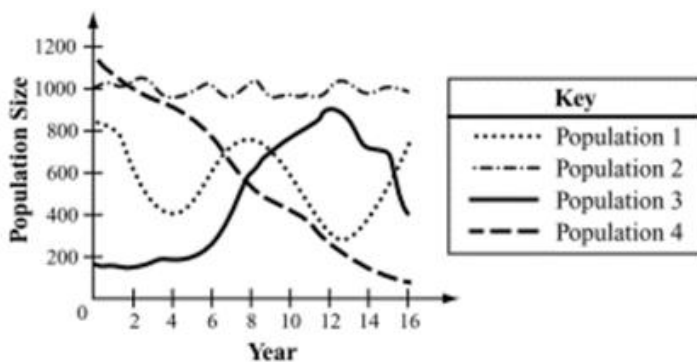
30. If several species of carnivores are removed from an ecosystem, the most likely effect on the ecosystem will be:

- A. An increase in the kinds of autotrophs
- B. A decrease in the number of abiotic factors
- C. A decrease in stability among populations
- D. An increase in the rate of succession
- E. None of the above

31. Temperate deciduous forest biome's temperature curve is represented by



- A. A  
B. B  
C. C  
D. D  
E. None of the above
32. The graph below shows changes in the sizes of four animal populations over a 16-year period. In which population was birthrate most likely greater than death rate from year 8 to year 12?



- A. Population 1  
B. Population 2  
C. Population 3  
D. Population 4  
E. None of the above

33. Which of the following human activities reduces biodiversity?

- A. Prohibiting hunting in wildlife preserves  
B. Taking tissue samples from members of endangered species  
C. Planting only native grass species to prevent erosion beside highways  
D. Planting only red pine trees to replace native hardwood forests cut for lumber  
E. None of the above

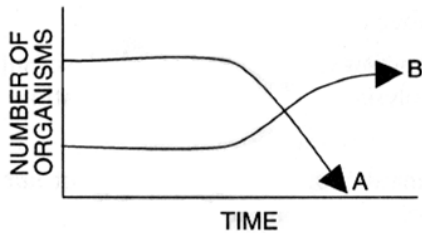
34. Air samples taken in Canada since 1986 show that atmospheric carbon dioxide concentration is higher on average in winter than in summer. Which of the following statements best explains the difference in carbon dioxide concentrations?

- A. The rate of decomposition is slower in winter than in summer  
B. The greenhouse effect is more pronounced in winter than in summer  
C. The number of animals that are active is less in winter than in summer  
D. The amount of photosynthesis by plants is lower in winter than in summer  
E. None of the above

35. If many trees are removed from a forest by logging, what is the most immediate effect on the carbon cycle in that forest?

- A. increased rates of decomposition  
B. decreased use of atmospheric CO<sub>2</sub>  
C. decreased combustion of fossil fuels  
D. increased production of organic compounds  
E. No effect

36. The graph below shows the changes of two fish populations in a pond. Which of the following would NOT be a reason for the decline in Fish A?

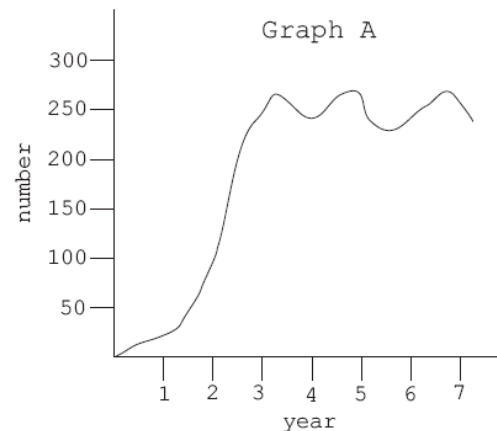


- A. Fish A produced less offspring than Fish B  
 B. Fish A could not compete with Fish B for the same food  
 C. Fish B began to prey upon Fish A  
 D. Fish B resisted a new disease but A did not  
 E. Fish A was overfished
37. The table below shows data on reproduction for mouse populations at various population densities.

Average number of Mice per Cubic Meter	Average Percent of Pregnant Females	Average Number of Mice Per Litter
34	58.3	6.2
118	49.4	5.7
350	51.0	5.6
1600	43.3	5.1

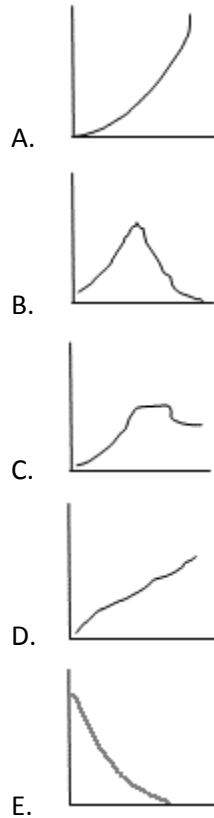
Based on the data, which of the following statements best describes an effect of population density on mouse populations?

- A. High population density increases the birthrate  
 B. High population density decreases the birthrate  
 C. High population density increases the male to female ratio  
 D. High population density increases the number of successful mating  
 E. Population density has no effect on population
38. Which of the following is **ALWAYS** a result of immigration into a population?
- A. New individuals are added to the population  
 B. Some individuals are forced to leave the population  
 C. The survival rate of the individuals in the population increases  
 D. The genetic diversity among the individuals in the population decreases  
 E. Some species die off
39. The graph shows the number of organisms in an area over time. During which year did the population reach its carrying capacity?



- A. Year 1  
 B. Year 2  
 C. Year 3  
 D. Year 6  
 E. Year 7
40. Bioremediation refers to
- A. Attempts to increase the number of species in a polluted area  
 B. Use of organisms to treat or clean up the environment  
 C. Changes in vegetation brought about by invasive species  
 D. Use of chemicals to control vegetation  
 E. none of the above

41. An herbivore has been living in balance with its environment for years. Then a drought occurred and lasted for several years. Which graph would best represent the population of this herbivore during this period?



42. Which statement describes one biotic factor using one of the abiotic factors?

- A. Trees absorb water as a raw material for photosynthesis
- B. Insects eat and digest the leaves of trees
- C. Erosion of sedimentary rocks adds phosphorous to the soil
- D. Fungi release oxygen from the trees back into the air
- E. Birds eat the seeds of the plants

**Choose the alternative energy term associated with the environmental impact questions in this block**

- A. *Wind power*
- B. *Solar power*
- C. *Geothermal power*
- D. *Biomass for electricity*
- E. *Hydroelectric power*

43. Impact to water quality and consumption

44. Impact to aquatic ecosystems

45. Land degradation and habitat loss

46. Impact to wildlife such as birds and bats

47. Air emissions and water use

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**Choose the answers for questions in this block from the terms below.**

- A. *Conservation*
- B. *Preservation*
- C. *Remediation*
- D. *Reclamation*
- E. *Rehabilitation*

48. Way to maintain biodiversity and ecosystems, that are so far untouched by humans, in their present condition

49. Sustainable use and management of natural resources

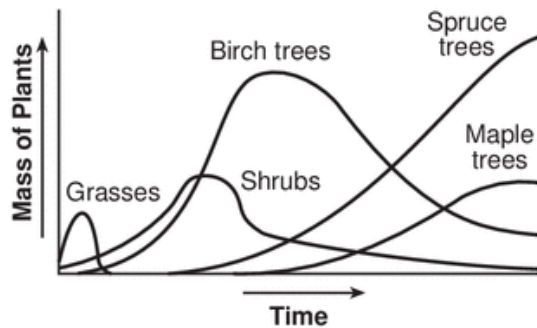
50. Cleansing and repair of degraded sites via physical or chemical means

51. Rebuild a community into a functioning system which may differ from the original condition

52. Rebuild a community to return it to its original state

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The graph shows the masses of different types of plants found in an area of the Adirondack Mountains after a forest fire occurred.



53. Based on the information provided in the graph, the process that is occurring is

- A. ecological succession
- B. selective breeding
- C. biological evolution
- D. genetic engineering
- E. mass extinction

54. The time shown in the graph is most likely measured in

- A. days
- B. months
- C. weeks
- D. years
- E. centuries

55. A farmer decides to place less nitrogen fertilizer on his corn fields. Which of the following consequences would **LEAST** likely to happen?

- A. His corn plants would show decreased growth
- B. His nearby pond would show greater algae growth
- C. The number of weeds in the fields would decrease
- D. There would be a greater need for other essential elements
- E. His corn yield will be lower

56. Which of these factors affect Biodiversity the MOST?

- A. Introduced species
- B. Habitat destruction
- C. Pollution
- D. Population growth
- E. Over consumption

57. A population dynamics research of June beetles estimates that the population size is 3,000. Over the course of a month, the study records 400 births and 150 deaths in the population. The population size in 6 months is predicted to be:

- A. 3250 beetles
- B. 3500 beetles
- C. 4500 beetles
- D. 4945 beetles
- E. 6250 beetles

58. A population of Spotted Fritillary butterflies exhibits logistic growth. If the carrying capacity is 500 butterflies and  $r = 0.1$  individuals per month, what is the maximum population growth rate for the population?

- A. 5 individuals/month
- B. 6.25 individuals/month
- C. 12.5 individuals/month
- D. 25 individuals/month
- E. 50 individuals/month

59. A population of Nicotiana, an annual plant, increases by 12% every year. The doubling time for this population is

- A. 1.2 years
- B. 6.1 years
- C. 8.25 years
- D. 12 years
- E. 16.7 years

END